# Experimental Suppression of Multiple Scattering
# Comparison of Different Methods and Applications

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Dynamic and static light scattering experiments are important tools for the investigation and characterization of structural and dynamic properties of complex fluids, e.g. polymer solutions and colloids. However, the analysis of light scattering experiments is restricted to low concentrations in order to avoid multiple scattering. Several experimental set-ups have been proposed to suppress multiple scattering contributions experimentally. We compare the 3D-cross correlation technique with the one-beam cross correlation technique. In both experiments only one laser wavelength is used. The general measuring principle is different: While in the 3D-cross correlation experiment two scattering experiments are performed in the same scattering volume, in the one beam set-up the fact that the coherence area of the singly scattered light is larger than the coherence area of the multiple scattered light is used. We can also show that the analysis of the cross correlation function in the one beam experiment allows the determination of the singly scattered light intensity, which leads to the differential cross section. We apply the technique to study the temperature dependence of the critical fluctuations in a solution of polystyrene ($M_w = 1.11 \times 10^5$ g mol) in cyclohexane. We show that the singly scattered intensity determined at a different scattering angle can be described by the Ornstein-Zernike function over the entire temperature range of 313.15-293.49 K. The data will also be compared with the data recently obtained in the 3D-cross correlation set-up.